

REMARKS**Amendments**

Claims 6 and 12 have been cancelled.

The claims have been amended to overcome a rejection under 35 U.S.C. § 112, ¶2, and to more particularly point out and distinctly claim the subject matter that applicants regard as the invention. Support for the amendment to claims 4 and 9 is found on page 4, lines 19-22. Support for newly presented claims 14-16 is found on page 4, lines 3-14; and page 6, lines 12-21.

It is submitted that no new matter is introduced by these amendments and new claims. It is submitted that these amendments and new claims do not introduce any new questions of patentability. Entry of this amendment is respectfully requested.

Pending Claims

The pending claims, after entry of the amendment, are 1, 3-5, 7-11, and 14-16. Claims 6 and 12 have been cancelled. Claims 2 and 13 were cancelled in a previous communication.

Missing PTO-892

Although the official action of July 5, 2001 (Paper 7) indicated that a PTO-892 was included, none was received. The Examiner is respectfully requested to include a copy of the PTO-892 with the next communication.

Rejection under 35 U.S.C. § 112, ¶2

Claims 1 and 3-12 were rejected under 35 U.S.C. § 112, ¶2. Claims 1, 7, and 9 have been amended. It is submitted that this rejection has been overcome.

First Rejection under 35 U.S.C. § 102(b)

Claims 1, 3, 5, 6, 9, 11, and 12 were rejected under 35 U.S.C. § 102(b) as anticipated by JP 10-218675.

The abstract of JP 10-218675 bears a publication date of 8/18/98. Applicants' have submitted a certified translation of the Japanese priority document (Application H10-114671, filed April 24, 1998). The Examiner asserted that the priority document did not support the claims as they were interpreted by the Office.

The claims have been amended to recite "spraying ceramic powder and water together with compressed air." The independent claims are supported by the priority document. *See*, for example, translation of H10-114671: claim 1; paragraph 8; paragraph 12; and paragraph 14. JP 10-218675 is not available as a reference against the independent claims. The rejection of claims as anticipated by JP 10-218675 should be withdrawn.

Second Rejection under 35 U.S.C. § 102(b)

Claims 1, 3, and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by Hakotani, U.S. Patent 5,370,759 ("Hakotani").

Hakotani discloses a method for producing a multilayered ceramic substrate. Abstract. Green sheets that include an inorganic material are formed on a glass-ceramic substrate material and removed after firing. Abstract. The inorganic material may be removed by a conventional method such as sand blast, ultrasonic cleaning, brushing, water-jetting and the like. Hakotani, column 7, lines 59-62.

Hakotani does not disclose removing the shrinkage suppression sheet by spraying a mixture of ceramic powder and water wherein the ceramic powder comprises the same ceramic material as said shrinkage suppression sheet as now recited by applicants' claims. The Office admits that Hakotani does not disclose removing

unsintered alumina using a blast of alumina. *See*, paper 9, page 5, line 21. The rejection of claims 1, 3, and 9 as anticipated by Hakotani should be withdrawn.

First Rejection under 35 U.S.C. § 103(a)

Claims 4, 7, 8, and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over JP 10-218675.

As discussed above, the claims have been amended so the independent claims are supported by the priority document. JP 10-218675 is not available as a reference against the independent claims. The rejection of claims as unpatentable over JP 10-218675 should be withdrawn.

Second Rejection under 35 U.S.C. § 103(a)

Claims 4, 7, and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over Hakotani.

As discussed above, Hakotani does not disclose removing the shrinkage suppression sheet by spraying a mixture of ceramic powder and water wherein the ceramic powder comprises the same ceramic material as said shrinkage suppression sheet as now recited by applicants' claims. Nothing in Hakotani suggests the invention now recited by applicants' claims. The rejection of claims as unpatentable over Hakotani should be withdrawn.

Third Rejection under 35 U.S.C. § 103(a)

Claims 1 and 3-12 were rejected under 35 U.S.C. § 103(a) as unpatentable over Hakotani, in view of Yam, U.S. Patent 5,827,114 ("Yam") and Kim, U.S. Patent 4,896,464 ("Kim").

The Office asserts that "The use of alumina abrasive particles to remove unsintered alumina from the substrate would have been obvious to one of ordinary skill

in the art." Paper 9, page 6, lines 11-13. This assertion is respectfully traversed.

Yam discloses a slurry blasting process in which the liquid carrier medium contains a dispersed water-soluble particulate abrasive. Yam, Abstract. Although Yam discusses the use of abrasive materials to remove "adherent materials," the reference teaches away from applicants' invention.

Thus, it would be most worthwhile to use a water soluble abrasive blast media with the water stream to accelerate the particles through the blast nozzle and treat softer substrates and/or avoid the costly clean-up expenses inherent upon using hard, water insoluble abrasives such as sand.

Yam, column 2, lines 32-37 (emphasis added).

Still further, there is needed a wet blasting process wherein a mixture of soluble abrasive particles dispersed within a liquid stream is directed to a target surface and wherein the integrity of the soluble abrasive particle during transport from the supply of abrasive particles to the blast nozzle apparatus and/or from the blast nozzle apparatus to the targeted surface can be maintained so as to retain the maximum cutting force of the particles and at the same time, take advantage of the soluble nature of the abrasive particles with respect to vastly reduced clean-up costs relative to such costs when insoluble abrasive blast media such as sand is used.

Yam, column 4, lines 26-37 (emphasis added).

As shown by these passages, Yam teaches that water soluble abrasives have "vastly reduced clean up costs" relative to insoluble abrasives. A reference must be considered for all that it teaches, including disclosures that teach away from the invention as well as disclosures that point toward the invention. A reference that

teaches away from an invention cannot make it obvious. The person of ordinary skill in the art, wanting to remove a layer of unsintered alumina and having the advantage of the teachings of Yam, would be motivated to select a water soluble material as the abrasive because Yam teaches that there are "vastly reduced cleanup costs" when water soluble abrasives are used.

Kim discloses a process in which ceramic material is abraded away to form a module comprising protruding, upstanding electrically conductive pins. Abstract. The abrasive particles may be any suitable abrasive such as aluminum oxide, silicon carbide, or tungsten carbide. Kim, column 4, lines 31-34.

Nothing in Kim would motivate the person of ordinary skill in the art to select alumina from the "suitable abrasives" disclosed in Kim's for use in applicants' invention. Kim does not teach any particular advantages to the use of alumina.

Further, Kim removes ceramic material after it has been sintered. *See*, for example Kim, column 3, lines 35-35-38 ("layer 12 and 14 may be comprised of alumina which have been sintered at a temperature of approximately 1000°C"). In contrast, in applicants' invention a material that does not sinter at the sintering temperature of the green sheet laminated body is used as the shrinkage suppression sheet. Page 4, lines 3-5. Consequently, in applicants' invention it is necessary to evenly remove the shrinkage sheet of unsintered alumina without removing or damaging the underlying sintered ceramic. *See*, page 7, lines 1-5. The person of ordinary skill in the art, wanting to remove a layer of unsintered alumina without removing or damaging the underlying layer of ceramic and having the advantage of the teaching of Kim, would not be motivated to use alumina because Kim teaches that alumina removes a sintered ceramic.

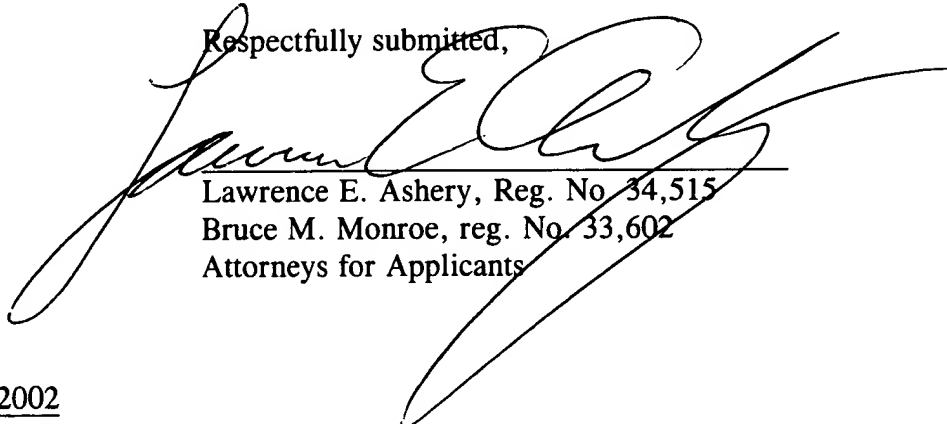
The Office admits that Hakotani does not disclose removing unsintered alumina using a blast of alumina. *See*, paper 9, page 5, line 21. For the reasons discussed above, this deficiency is not overcome by the teaching of Yam and/or Kim. The

rejection of claims as unpatentable over Hakotani, in view of Yam and Kim should be withdrawn

Conclusion

It is respectfully submitted² that the claims are in condition for immediate allowance and a notice to this effect is earnestly solicited. The Examiner is invited to phone applicants' attorney if it is believed that a telephonic or personal interview would expedite prosecution of this application.

Respectfully submitted,


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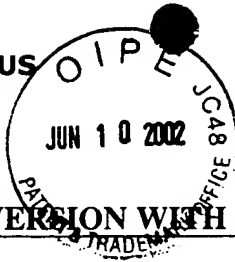
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May 30, 2002

COPY OF PAPERS
ORIGINALLY FILEDVERSION WITH MARKINGS TO SHOW CHANGES MADEIN THE CLAIMS

Claims 6 and 12 have been cancelled. Claims 14-16 are newly presented. The claims have been amended as follows:

1. (Three Times Amended) A method for manufacturing a multi-layered ceramic substrate, said method comprising the steps of:

forming a shrinkage suppression sheet comprising a ceramic material on at least one face of an unfired green sheet laminated body;

firing said green sheet laminated body on which said shrinkage suppression sheet is formed on the at least one face; and

removing said shrinkage suppression sheet by spraying[at least one of] ceramic powder and water together with compressed air onto said shrinkage suppression sheet on the at least one face of said green sheet laminated body after firing;

wherein said ceramic powder comprises the same ceramic[is made from a] material[which is the same as a the material used in] as said shrinkage suppression sheet.

4. (Twice Amended) The method for manufacturing a multi-layered ceramic substrate as defined in Claim 1, wherein said compressed air has a pressure between 3.0 and 5.5[kgf/cm²] kg/cm².

5. (Once Amended) The method for manufacturing a multi-layered ceramic substrate as defined in Claim 1, wherein[a] the mean particle size of the particles of said ceramic powder is not greater than 10 μm .

7. (Twice Amended) The method for manufacturing a multi-layered ceramic

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2 substrate as defined in Claim 1, wherein said shrinkage suppression sheet is formed on
3 both faces of said unfired green sheet laminated body and[at least one of] said ceramic
4 powder and water is sprayed together with said compressed air onto said shrinkage
5 suppression sheet on both faces of said green sheet laminated body simultaneously after
6 firing.

1 9. (Three Times Amended) A method for manufacturing a multi-layered
2 ceramic substrate, said method comprising the steps of:

3 forming a shrinkage suppression sheet comprising a ceramic material on two
4 faces of an unfired green sheet laminated body;

5 firing said green sheet laminated body; and

6 removing said shrinkage suppression sheet by spraying[at least one of water,
7 ceramic powder, and] a mixture of ceramic powder and water together with
8 compressed air onto at least one of the two faces of said green sheet laminated body,
9 after firing;

10 wherein said ceramic powder comprises the same ceramic[is made from a]
11 material[which is the same as a the material used in] as said shrinkage suppression
12 sheet.

1 10. (Twice Amended) The method for manufacturing a multi-layered ceramic
2 substrate as defined in Claim 9, wherein the compressed air has a pressure between 3.0
3 and 5.5[kgf/cm²] kg/cm².